**Intuition vs. Science: What's Wrong with Your Thinking, Fast and Slow**

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| <http://www.brainpickings.org/wp-content/uploads/2011/10/thinkingfastandslow.jpg> |
| [Amazon](http://www.amazon.com/Thinking-Fast-Slow-Daniel-Kahneman/dp/0374275637/ref=sr_1_1?s=books&ie=UTF8&qid=1329320838&sr=1-1) |

**From Completely Useless to Moderately Useful**

            In 1955, a twenty-one-year-old Daniel Kahneman was assigned the formidable task of creating an interview procedure to assess the fitness of recruits for the Israeli army. Kahneman’s only qualification was his bachelor’s degree in psychology, but the state of Israel had only been around for seven years at the time so the Defense Forces were forced to satisfice. In the course of his undergraduate studies, Kahneman had discovered the writings of a psychoanalyst named Paul Meehl, whose essays he would go on to “almost memorize” as a graduate student. Meehl’s work gave Kahneman a clear sense of how he should go about developing his interview technique.

If you polled psychologists today to get their predictions for how successful a young lieutenant inspired by a book written by a psychoanalyst would be in designing a personality assessment protocol—assuming you left out the names—you would probably get some dire forecasts. But [Paul Meehl](http://en.wikipedia.org/wiki/Paul_Meehl) wasn’t just any psychoanalyst, and [Daniel Kahneman](http://en.wikipedia.org/wiki/Daniel_Kahneman) has gone on to become one of the most influential psychologists in the world. The book whose findings Kahneman applied to his interview procedure was *Clinical vs. Statistical Prediction: A Theoretical Analysis and a Review of the Evidence*, which Meehl lovingly referred to as “my disturbing little book.” Kahneman explains,

Meehl reviewed the results of 20 studies that had analyzed whether *clinical predictions* based on the subjective impressions of trained professionals were more accurate than *statistical* predictions made by combining a few scores or ratings according to a rule. In a typical study, trained counselors predicted the grades of freshmen at the end of the school year. The counselors interviewed each student for forty-five minutes. They also had access to high school grades, several aptitude tests, and a four-page personal statement. The statistical algorithm used only a fraction of this information: high school grades and one aptitude test. (222)

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| <http://www.bloomberg.com/image/iFlOgXWIjC_U.jpg> |
| Daniel Kahneman |

The findings for this prototypical study are consistent with those arrived at by researchers over the decades since Meehl released his book:

The number of studies reporting comparisons of clinical and statistical predictions has increased to roughly two hundred, but the score in the contest between algorithms and humans has not changed. About 60% of the studies have shown significantly better accuracy for the algorithms. The other comparisons scored a draw in accuracy, but a tie is tantamount to a win for the statistical rules, which are normally much less expensive to use than expert judgment. No exception has been convincingly documented. (223)

            Kahneman designed the interview process by coming up with six traits he thought would have direct bearing on a soldier’s success or failure, and he instructed the interviewers to assess the recruits on each dimension in sequence. His goal was to make the process as systematic as possible, thus reducing the role of intuition. The response of the recruitment team will come as no surprise to anyone: “The interviewers came close to mutiny” (231). They complained that their knowledge and experience were being given short shrift, that they were being turned into robots. Eventually, Kahneman was forced to compromise, creating a final dimension that was holistic and subjective. The scores on this additional scale, however, seemed to be highly influenced by scores on the previous scales.

When commanding officers evaluated the new recruits a few months later, the team compared the evaluations with their predictions based on Kahneman’s six scales. “As Meehl’s book had suggested,” he writes, “the new interview procedure was a substantial improvement over the old one… We had progressed from ‘completely useless’ to ‘moderately useful’” (231).

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| <http://www.nndb.com/people/485/000062299/tversky-sm.jpg> |
| [Amos Tversky](http://www.nndb.com/people/485/000062299/tversky-sm.jpg) |

            Kahneman recalls this story at about the midpoint of his magnificent, encyclopedic book [*Thinking, Fast and Slow*](http://www.amazon.com/Thinking-Fast-Slow-Daniel-Kahneman/dp/0374275637/ref=sr_1_1?s=books&ie=UTF8&qid=1329320838&sr=1-1). This is just one in a long series of run-ins with people who don’t understand or can’t accept the research findings he presents to them, and it is neatly woven into his discussions of those findings. Each topic and each chapter feature a short test that allows you to see where you fall in relation to the experimental subjects. The remaining thread in the tapestry is the one most readers familiar with Kahneman’s work most anxiously anticipated—his friendship with [AmosTversky](http://en.wikipedia.org/wiki/Amos_Tversky), with whom he shared the Nobel prize in economics in 2002.

Most of the ideas that led to experiments that led to theories which made the two famous and contributed to the founding of an entire new field, [behavioral economics](http://en.wikipedia.org/wiki/Behavioral_economics), were borne of casual but thrilling conversations both found intrinsically rewarding in their own right. Reading this book, as intimidating as it appears at a glance, you get glimmers of Kahneman’s wonder at the bizarre intricacies of his own and others’ minds, flashes of frustration at how obstinately or casually people avoid the implications of psychology and statistics, and intimations of the deep fondness and admiration he felt toward Tversky, who died in 1996 at the age of 59.

**Pointless Punishments and Invisible Statistics**

            When Kahneman begins a chapter by saying, “I had one of the most satisfying eureka experiences of my career while teaching flight instructors in the Israeli Air Force about the psychology of effective training” (175), it’s hard to avoid imagining how he might have relayed the incident to Amos years later. It’s also hard to avoid speculating about what the book might’ve looked like, or if it ever would have been written, if he were still alive. The eureka experience Kahneman had in this chapter came about, as many of them apparently did, when one of the instructors objected to his assertion, in this case that “rewards for improved performance work better than punishment of mistakes.” The instructor insisted that over the long course of his career he’d routinely witnessed pilots perform worse after praise and better after being screamed at. “So please,” the instructor said with evident contempt, “don’t tell us that reward works and punishment does not, because the opposite is the case.” Kahneman, characteristically charming and disarming, calls this “a joyous moment of insight” (175).

            The epiphany came from connecting a familiar statistical observation with the perceptions of an observer, in this case the flight instructor. The problem is that we all have a tendency to discount the role of chance in success or failure. Kahneman explains that the instructor’s observations were correct, but his interpretation couldn’t have been more wrong.

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| <http://galton.org/photos/about-50.gif> |
| [Francis Galton](http://en.wikipedia.org/wiki/Francis_Galton), who first described regression to the mean |

What he observed is known as *regression to the mean*, which in that case was due to random fluctuations in the quality of performance. Naturally, he only praised a cadet whose performance was far better than average. But the cadet was probably just lucky on that particular attempt and therefore likely to deteriorate regardless of whether or not he was praised. Similarly, the instructor would shout into the cadet’s earphones only when the cadet’s performance was unusually bad and therefore likely to improve regardless of what the instructor did. The instructor had attached a causal interpretation to the inevitable fluctuations of a random process. (175-6)

The roster of domains in which we fail to account for regression to the mean is disturbingly deep. Even after you’ve learned about the phenomenon it’s still difficult to recognize the situations you should apply your understanding of it to. Kahneman quotes statistician David Freedman to the effect that whenever regression becomes pertinent in a civil or criminal trial the side that has to explain it will pretty much always lose the case. Not understanding regression, however, and not appreciating how it distorts our impressions has implications for even the minutest details of our daily experiences. “Because we tend to be nice to other people when they please us,” Kahneman writes, “and nasty when they do not, we are statistically punished for being nice and rewarded for being nasty” (176). Probability is a bitch.

**The Illusion of Skill in Stock-Picking**

            Probability can be expensive too. Kahneman recalls being invited to give a lecture to advisers at an investment firm. To prepare for the lecture, he asked for some data on the advisers’ performances and was given a spreadsheet for investment outcomes over eight years. When he compared the numbers statistically, he found that none of the investors was consistently more successful than the others. The correlation between the outcomes from year to year was nil. When he attended a dinner the night before the lecture “with some of the top executives of the firm, the people who decide on the size of bonuses,” he knew from experience how tough a time he was going to have convincing them that “at least when it came to building portfolios, the firm was rewarding luck as if it were a skill.” Still, he was amazed by the execs’ lack of shock:

[](http://www.nikonwatch.com/images/nelson.jpg)

We all went on calmly with our dinner, and I have no doubt that both our findings and their implications were quickly swept under the rug and that life in the firm went on just as before. The illusion of skill is not only an individual aberration; it is deeply ingrained in the culture of the industry. Facts that challenge such basic assumptions—and thereby threaten people’s livelihood and self-esteem—are simply not absorbed. (216)

The scene that follows echoes the first chapter of Carl Sagan’s classic paean to skepticism *Demon-Haunted World*, where Sagan recounts being bombarded with questions about science by a driver who was taking him from the airport to an auditorium where he was giving a lecture. He found himself explaining to the driver again and again that what he thought was science—Atlantis, aliens, crystals—was, in fact, not. "As we drove through the rain," Sagan writes, "I could see him getting glummer and glummer. I was dismissing not just some errant doctrine, but a precious facet of his inner life" (4). In Kahneman’s recollection of his drive back to the airport after his lecture, he writes of a conversation he had with his own driver, one of the execs he’d dined with the night before.

He told me, with a trace of defensiveness, “I have done very well for the firm and no one can take that away from me.” I smiled and said nothing. But I thought, “Well, I took it away from you this morning. If your success was due mostly to chance, how much credit are you entitled to take for it? (216)

**Blinking at the Power of Intuitive Thinking**

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| <http://www.psychologicalscience.org/observer/2006/0306/images/gladwell_smile.jpg> |
| Malcolm Gladwell |

            It wouldn’t surprise Kahneman at all to discover how much stories like these resonate. Indeed, he must’ve considered it a daunting challenge to conceive of a sensible, cognitively easy way to get all of his vast knowledge of biases and heuristics and unconscious, automatic thinking into a book worthy of the science—and worthy too of his own reputation—while at the same time tying it all together with some intuitive overarching theme, something that would make it read more like a novel than an encyclopedia. [Malcolm Gladwell](http://en.wikipedia.org/wiki/Malcolm_Gladwell) faced a similar challenge in writing [*Blink: the Power of Thinking without Thinking*](http://en.wikipedia.org/wiki/Blink_(book)), but he had the advantages of a less scholarly readership, no obligation to be comprehensive, and the freedom afforded to someone writing about a field he isn’t one of the acknowledged leaders and creators of. Ultimately, Gladwell’s book painted a pleasing if somewhat incoherent picture of intuitive thinking. The power he refers to in the title is over the thoughts and actions of the thinker, not, as many must have presumed, to arrive at accurate conclusions.

It’s entirely possible that Gladwell’s misleading title came about deliberately, since there’s a considerable market for the message that intuition reigns supreme over science and critical thinking. But there are points in his book where it seems like Gladwell himself is confused. [Robert Cialdini](http://en.wikipedia.org/wiki/Robert_Cialdini), Steve Marin, and Noah Goldstein cover some of the same research Kahneman and Gladwell do, but their book [*Yes!: 50 Scientifically Proven Ways to be Persuasive*](http://www.amazon.com/Yes-Scientifically-Proven-Ways-Persuasive/dp/1416570969) is arranged in a list format, with each chapter serving as its own independent mini-essay.

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| <http://upload.wikimedia.org/wikipedia/en/3/3c/RCialdini.jpg> |
| Robert Cialdini |

Early in *Thinking, Fast and Slow*, Kahneman introduces us to two characters, System 1 and System 2, who pass the controls of our minds back and forth between themselves according the expertise and competency demanded by current exigency or enterprise. System 1 is the more intuitive, easygoing guy, the one who does what Gladwell refers to as “thin-slicing,” the fast thinking of the title. System 2 works deliberately and takes effort on the part of the thinker. Most people find having to engage their System 2—multiply 17 by 24—unpleasant to one degree or another.

The middle part of the book introduces readers to two other characters, ones whose very names serve as a challenge to the field of economics. Econs are the beings market models and forecasts are based on. They are rational, selfish, and difficult to trick. Humans, the other category, show inconsistent preferences, changing their minds depending on how choices are worded or presented, are much more sensitive to the threat of loss than the promise of gain, are sometimes selfless, and not only can be tricked with ease but routinely trick themselves. Finally, Kahneman introduces us to our “Two Selves,” the two ways we have of thinking about our lives, either moment-to-moment—experiences he, along with [Mihaly Csikzentmihhalyi](http://en.wikipedia.org/wiki/Mihaly_Csikszentmihalyi) (author of [*Flow*](http://www.amazon.com/Flow-Psychology-Experience-Mihaly-Csikszentmihalyi/dp/0061339202)) pioneered the study of—or in abstract hindsight. It’s not surprising at this point that there are important ways in which the two selves tend to disagree.

**Intuition and Cerebration**

 The Econs versus Humans distinction, with its rhetorical purpose embedded in the terms, is plenty intuitive. The two selves idea, despite being a little too redolent of psychoanalysis, also works well. But the discussions about System 1 and System 2 are never anything but ethereal and abstruse. Kahneman’s stated goal was to discuss each of the systems as if they were characters in a plot, but he’s far too concerned with scientifically precise definitions to run with the metaphor. The term system is too bloodless and too suggestive of computer components; it’s too much of the realm of System 2 to be at all satisfying to System 1. The collection of characteristics *Thinking* links to the first system (see a list below) is lengthy and fascinating and not easily summed up or captured in any neat metaphor. But we all know what Kahneman is talking about. We could use mythological figures, perhaps Achilles or Orpheus for System 1 and Odysseus or Hephaestus for System 2, but each of those characters comes with his own narrative baggage. Not everyone’s System 1 is full of rage like Achilles, or musical like Orpheus. Maybe we could assign our System 1s idiosyncratic totem animals.

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| <http://res.mindbodygreen.com/img/ftr/mihaly-flow-ted-preview.jpg> |
| [Mihaly Csikzentmihalyi](http://www.mindbodygreen.com/0-2119/Mihaly-Csikszentmihalyi-on-Flow-Fulfillment.html) |

But I think the most familiar and the most versatile term we have for System 1 is intuition. It is a hairy and unpredictable beast, but we all recognize it. System 2 is actually the harder to name because people so often mistake their intuitions for logical thought. Kahneman explains why this is the case—because our cognitive resources are limited our intuition often offers up simple questions as substitutes from more complicated ones—but we must still have a term that doesn’t suggest complete independence from intuition and that doesn’t imply deliberate thinking operates flawlessly, like a calculator. I propose cerebration. The cerebral cortex rests on a substrate of other complex neurological structures. It’s more developed in humans than in any other animal. And the way it rolls trippingly off the tongue is as eminently appropriate as the swish of intuition. Both terms work well as verbs too. You can intuit, or you can cerebrate. And when your intuition is working in integrated harmony with your cerebration you are likely in the [state of flow](http://en.wikipedia.org/wiki/Flow_(psychology)) Csikzentmihalyi pioneered the study of.

While Kahneman’s division of thought into two systems never really resolves into an intuitively manageable dynamic, something he does throughout the book, which I initially thought was silly, seems now a quite clever stroke of brilliance. Kahneman has no faith in our ability to clean up our thinking. He’s an expert on all the ways thinking goes awry, and even he catches himself making all the common mistakes time and again. In the introduction, he proposes a way around the impenetrable wall of cognitive illusion and self-justification. If all the people gossiping around the water cooler are well-versed in the language describing biases and heuristics and errors of intuition, we may all benefit because anticipating gossip can have a profound effect on behavior. No one wants to be spoken of as the fool.

Kahneman writes, “it is much easier, as well as far more enjoyable, to identify and label the mistakes of others than to recognize our own.” It’s not easy to tell from his straightforward prose, but I imagine him writing lines like that with a wry grin on his face. He goes on,

Questioning what we believe and want is difficult at the best of times, and especially difficult when we most need to do it, but we can benefit from the informed opinions of others. Many of us spontaneously anticipate how friends and colleagues will evaluate our choices; the quality and content of these anticipated judgments therefore matters. The expectation of intelligent gossip is a powerful motive for serious self-criticism, more powerful than New Year resolutions to improve one’s decision making at work and at home. (3)

So we encourage the education of others to trick ourselves into trying to be smarter in their eyes. Toward that end, Kahneman ends each chapter with a list of sentences in quotation marks—lines you might overhear passing that water cooler if everyone where you work read his book.  I think he’s overly ambitious. At some point in the future, you may hear lines like “They’re counting on denominator neglect” (333) in a boardroom—where people are trying to impress colleagues and superiors—but I seriously doubt you’ll hear it in the break room. Really, what he’s hoping is that people will start talking more like behavioral economists. Though some undoubtedly will, *Thinking, Fast and Slow* probably won’t ever be as widely read as, say, Freud’s lurid pseudoscientific *On the Interpretation* *of Dreams*. That’s a tragedy.

Still, it’s pleasant to think about a group of friends and colleagues talking about something other than football and American Idol.

***Characteristics of System 1*** (105): Try to come up with a good metaphor.

·         generates impressions, feelings, and inclinations; when endorsed by System 2 these become beliefs, attitudes, and intentions

·         operates automatically and quickly, with little or no effort, and no sense of voluntary control

·         can be programmed by System 2 to mobilize attention when particular patterns are detected (search)

·         executes skilled responses and generates skilled intuitions, after adequate training

·         creates a coherent pattern of activated ideas in associative memory

·         links a sense of cognitive ease to illusions of truth, pleasant feelings, and reduced vigilance

·         distinguishes the surprising from the normal

·         infers and invents causes and intentions

·         neglects ambiguity and suppresses doubt

·         is biased to believe and confirm

·         exaggerates emotional consistency (halo effect)

·         focuses on existing evidence and ignores absent evidence (WYSIATI)

·         generates a limited set of basic assessments

·         represents sets by norms and prototypes, does not integrate

·         matches intensities across scales (e.g., size and loudness)

·         computes more than intended (mental shotgun)

·         sometimes substitutes an easier question for a difficult one (heuristics)

·         is more sensitive to changes than to states (prospect theory)

·         overweights low probabilities.

·         shows diminishing sensitivity to quantity (psychophysics)

·         responds more strongly to losses than to gains (loss aversion)

·         frames decision problems narrowly, in isolation from one another

Posted by [Dennis Junk](http://www.blogger.com/profile/05826244501737767190) at [9:11 AM](http://readingsubtly.blogspot.com/2012/02/intuition-vs-science-whats-wrong-with.html)

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